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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,626	09/08/2003	Sanjiv M. Shah	116536-153427	3443
	7590 10/12/200 ILLIAMSON & WYA	EXAMINER		
PACWEST CENTER, SUITE 1900 1211 S.W. FIFTH AVE.			WILSER, MICHAEL P	
PORTLAND, (ART UNIT	PAPER NUMBER
			2195	
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			10/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

		mN		
		Application No.	Applicant(s)	
.,		10/658,626	SHAH ET AL.	
	Office Action Summary	Examiner	Art Unit	
		Michael Wilser	2195	
Period fo	The MAILING DATE of this communication a or Reply	appears on the cover sheet w	ith the correspondence address	
WHIC - Exte after - If NC - Failu Any	IORTENED STATUTORY PERIOD FOR REF CHEVER IS LONGER, FROM THE MAILING ensions of time may be available under the provisions of 37 CFR of SIX (6) MONTHS from the mailing date of this communication. O period for reply is specified above; the maximum statutory period for reply will, by stare to reply within the set or extended period for reply will, by stareply received by the Office later than three months after the managed patent term adjustment. See 37 CFR 1.704(b).	DATE OF THIS COMMUNI 1.136(a). In no event, however, may a iod will apply and will expire SIX (6) MOI tute, cause the application to become Al	CATION. reply be timely filed NTHS from the mailing date of this communication. BANDONED (35 U.S.C. § 133).	
Status				
1)⊠	Responsive to communication(s) filed on 31	July 2007.	·	
		his action is non-final.		
3) 🗌	Since this application is in condition for allow	wance except for formal mat	ters, prosecution as to the merits is	
	closed in accordance with the practice unde	er <i>Ex parte Quayle</i> , 1935 C.E	D. 11, 453 O.G. 213.	
Disposit	ion of Claims			
4)⊠	Claim(s) 1-56 is/are pending in the applicati	on.		
	4a) Of the above claim(s) is/are withd	Irawn from consideration.		
5)	Claim(s) is/are allowed.		,	
6)⊠	Claim(s) <u>1-56</u> is/are rejected.			
7)	Claim(s) is/are objected to.			
8)□	Claim(s) are subject to restriction and	d/or election requirement.		
Applicat	ion Papers			
9)[The specification is objected to by the Exam	iner.		
10)	The drawing(s) filed on is/are: a) a	ccepted or b) objected to	by the Examiner.	
	Applicant may not request that any objection to t	he drawing(s) be held in abeya	nce. See 37 CFR 1.85(a).	
	Replacement drawing sheet(s) including the corr	ection is required if the drawing	g(s) is objected to. See 37 CFR 1.121(d).	
11)	The oath or declaration is objected to by the	Examiner. Note the attache	d Office Action or form PTO-152.	
Priority (under 35 U.S.C. § 119			
12)	Acknowledgment is made of a claim for foreign	ign priority under 35 U.S.C.	§ 119(a)-(d) or (f).	
a)	☐ All b)☐ Some * c)☐ None of:			
	1. Certified copies of the priority docume	ents have been received.		
	2. Certified copies of the priority docume			
	3. Copies of the certified copies of the p		received in this National Stage	
	application from the International Bure	eau (PCT Rule 17.2(a)).		
	See the attached detailed Office action for a I			

U.S. Patent and Trademark Office PTOL-326 (Rev. 08-06)

1) Notice of References Cited (PTO-892)

Paper No(s)/Mail Date ___

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO/SB/08)

Attachment(s)

4) Interview Summary (PTO-413)
Paper No(s)/Mail Date.

6) Other: ____.

5) Notice of Informal Patent Application

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DETAILED ACTION

Claims 1-56 are pending in this application.

Claim Rejections - 35 USC § 103

- 2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
 - (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
- 3. Claims 1-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Auslander et al. (US 2003/0200457) in view of Singhal et al. (US 6,578,033).
- 4. As per Claim 1, Auslander teaches the invention substantially as claimed including a method of managing a lock utilized by a plurality of threads executing on a computing device to coordinate access to a shared resource (page 2, paragraph 17) comprising:
- a. selecting by one of the threads an action to be performed by the thread upon the lock (page 2, paragraph 20), wherein the action is selected from a group comprising:
 - i. acquiring the lock (pages 2 & 3, paragraph 22);

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ii. trying to acquire the lock (pages 2 & 3, paragraph 22); and

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iii. releasing the lock (page 2, paragraph 20);

b. asynchronously querying and receiving a current state of the lock by the thread and representing each state by a multi-part state value conveying multiple information (page 3, paragraph 22);

c. speculatively determining by the thread, the next state of the lock, where the next state is the state of the lock if the thread proceeds to perform the selected action and the thread is successful (page 3, paragraph 22); and

d. attempting to perform by the thread, the selected action to transition the lock from the current state to the speculatively determined next state (page 3, paragraph 22).

- 5. However, Auslander does not explicitly discloses that the lock is considered to be in any one of at least four states in any point in time. However, Singhal discloses a method in which a lock can be in any of at least four states at any time (column 5, line 14 & Figure 7).
- 6. It would have been obvious to one of ordinary skill in the art at the time of invention to have the lock of at least four states of Singhal's invention be the lock in Auslander's invention. One would have been motivated to use this lock since it is known in the computing arts that a lock can have four or more states.

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7. As per Claim 2, Auslander further discloses that if the transition fails to acquire or release the lock to repeat the following steps until transition succeeds (page 3, paragraph 22):

- a. querying the current state of the lock (page 3, paragraph 22);
- b. determining the next state of the lock (page 3, paragraph 22); and
- c. transitioning lock from current state to next determined state (page 3, paragraph 22).
- 8. As per Claim 3, Auslander further discloses that if:
 - a. state transition succeeds (page 3, paragraph 22);
 - b. selected action is acquiring the lock (page 2, paragraph 21); and
- c. determined next state represents acquisition of the lock (page 3, paragraph 22); then
 - d. indicate acquisition of the lock (page 2 & 3, paragraph 22).
- 9. As per Claim 4, Auslander further discloses that if:
 - a. state transition succeeds (page 3, paragraph 22);
 - b. selected action is acquiring the lock (page 2, paragraph 21); and
- c. determined next state does not represent acquisition of the lock (page 3, paragraph 22); then
- d. add the thread to the end of a queue of threads waiting to acquire the lock (page 2, paragraph 21);

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e. wait to receive notification that thread may acquire the lock (page 2, paragraph 21); and

- f. indicate the acquisition of the lock (page 2 & 3, paragraph 22).
- 10. As per Claim 5, Auslander further discloses that if:
 - a. state transition succeeds (page 3, paragraph 22); and
 - b. selected action is releasing the lock (page 3, paragraph 22); then
- c. determine the number of threads in queue waiting to acquire lock utilizing the determined next stet of the lock (page 2, paragraph 21).
- 11. As per Claim 6, Auslander further discloses that if the queue includes at least a first thread (page 3, paragraph 22):
 - a. remove the first thread from the queue (page 3, paragraph 22); and
 - b. notify the first thread that it has acquired the lock (page 3, paragraph 22).
- 12. As per Claim 7, Auslander further discloses that if:
 - a. selected action is trying to acquire the lock (page 2, paragraph 21); and
 - b. state transition fails (page 3, paragraph 22); then
 - c. indicate the lock was unable to be acquired (page 3, paragraph 22).
- 13. As per Claim 8, Auslander further discloses that if:
 - a. state transition succeeds (page 3, paragraph 22); and

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b. selected action is trying to acquire the lock (page 2, paragraph 21); then

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- c. indicate the acquisition of the lock (page 2 & 3, paragraph 22).
- 14. As per Claims 9-12, they are rejected for the same reason as Claims 3-6 above.
- 15. As per Claim 13, Auslander further discloses that the thread includes:
 - a. a unique thread identifier (page 2, paragraph 18);
- b. next thread field to facilitate access to the next thread in a queue of thread waiting to acquire the lock (page 2, paragraph 18 & 21); and
 - c. thread is capable of waiting for single lock at a time (page 2, paragraph 20).
- 16. As per Claim 14, Auslander further discloses that the action of acquiring the lock includes the inability to timeout or fail to acquire the lock (page 2, paragraph 20).
- 17. As per Claim 15, Auslander further discloses that when the locks state may change:
 - a. querying the current state of the lock (page 3, paragraph 22); and
- b. transitioning the lock from the current state to the next determined state of the lock (page 3, paragraph 22).
- 18. As per Claim 16, Auslander teaches the invention substantially as claimed including an apparatus comprising:

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- a. a processor (page 1, paragraph 1);
- b. a storage medium coupled to the processor, and having stored therein programming instructions to be operated by the processor to implement a lock acquirer to acquire a lock, having a multi-part value (page 2, paragraph 18) including:
- c. a flag value, a first thread value, and a last thread value (page 2, paragraph 18); wherein the lock acquirer performs an acquisition of the lock (page 2, paragraph 20) via
- d. asynchronously querying and receiving a current state of the lock by the lock acquirer and representing each state by a multi-part state value conveying multiple information (page 3, paragraph 22);
- e. speculatively determining by the lock acquirer, the next state of the lock, where the next state is the state of the lock if the lock acquirer proceeds to perform the selected action and the lock acquirer is successful (page 3, paragraph 22); and
- f. attempting to perform by the lock acquirer, the selected action to transition the lock from the current state to the speculatively determined next state (page 3, paragraph 22).
- 19. However, Auslander does not explicitly discloses that the lock is considered to be in any one of at least four states in any point in time. However, Singhal discloses a method in which a lock can be in any of at least four states at any time (column 5, line 14 & Figure 7).

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20. It would have been obvious to one of ordinary skill in the art at the time of invention to have the lock of at least four states of Singhal's invention be the lock in Auslander's invention. One would have been motivated to use this lock since it is known in the computing arts that a lock can have four or more states.

- 21. As per Claim 17, Auslander further discloses that the lock acquirer is capable of performing two general actions of acquiring the lock (page 2 & 3, paragraph 22) and trying to acquire the lock (page 2 &3, paragraph 22) wherein:
 - a. state transition fails (page 3, paragraph 22); and
- b. general action is acquiring the lock (page 2 & 3, paragraph 22) then the lock acquirer is capable of repeating (page 3, paragraph 22) the steps of:
 - c. querying the current state of the lock (page 3, paragraph 22);
 - d. determining the next state of the lock (page 3, paragraph 22); and
- e. attempting to transition the lock from current state to the next determined state of the lock (page 3, paragraph 22).
- 22. As per Claim 18, Auslander further discloses of indicating that the lock was unable to be acquired (page 3, paragraph 22).
- 23. As per Claim 19, Auslander further discloses of indicating that the lock was acquired (page 2 & 3, paragraph 22).

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24. As per Claim 20, it is rejected for the same reason as Claim 3 above.

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- 25. As per Claim 21, Auslander further discloses that if:
 - a. state transition fails (page 3, paragraph 22);
 - b. general action is acquire the lock (page 2, paragraph 21); and
- c. determined next state does not represent acquisition of the lock (page 3, paragraph 22); then the lock acquirer is further capable of
- d. adding the thread to the end of a queue of threads waiting to acquire the lock (page 2, paragraph 21);
- e. waiting to receive notification that the thread may acquire the lock (page 2,paragraph 21); and
 - f. indicating the acquisition of the lock (page 2 & 3, paragraph 22).
- 26. As per Claim 22, it is rejected for the same reason as Claim 14 above.
- 27. As per Claim 23, Auslander teaches the invention substantially as claimed including an apparatus comprising:
 - a. a processor (page 1, paragraph 1);
- b. a storage medium coupled to the processor, and having stored therein programming instructions to be operated by the processor to implement a lock releaser to release a lock, having a multi-part value (page 2, paragraph 18) including:

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c. a flag value, a first thread value, and a last thread value (page 2, paragraph 18); wherein the lock releaser releases a hold on the lock (page 2, paragraph 20) via

d. asynchronously querying and receiving a current state of the lock by the lock releaser and representing each state by a multi-part state value conveying multiple information (page 3, paragraph 22);

- e. speculatively determining by the lock releaser, the next state of the lock, where the next state is the state of the lock if the lock releaser proceeds to perform the selected action and the lock releaser is successful (page 3, paragraph 22); and
- f. attempting to perform by the lock releaser, the selected action to transition the lock from the current state to the speculatively determined next state (page 3, paragraph 22).
- 28. However, Auslander does not explicitly discloses that the lock is considered to be in any one of at least four states in any point in time. However, Singhal discloses a method in which a lock can be in any of at least four states at any time (column 5, line 14 & Figure 7).
- 29. It would have been obvious to one of ordinary skill in the art at the time of invention to have the lock of at least four states of Singhal's invention be the lock in Auslander's invention. One would have been motivated to use this lock since it is known in the computing arts that a lock can have four or more states.

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30. As per Claim 24, it is rejected for the same reason as Claim 2 above.

31. As per Claim 25, Auslander further discloses that if the state transition succeeds (page 3, paragraph 22), the lock releaser is further capable of determining the number of threads in a queue waiting to acquire the lock utilizing the determined next state of the lock (page 2, paragraph 21).

- 32. As per Claim 26, it is rejected for the same reason as Claim 6 above.
- 33. As per Claim 27, Auslander further discloses that the lock releaser (page 2, paragraph 20) is capable of removing the first thread from the queue utilizing a thread having:
 - a. a unique thread identifier (page 2, paragraph 18); and
- b. a next thread value to facilitate access to the next thread in the queue (page 2, paragraph 18 & 21).
- 34. As per Claim 28, it is rejected for the same reason as Claim 15 above.
- 35. As per Claims 29-43, they are rejected for the same reason as Claims 1-15 above.

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36. As per Claim 44, Auslander teaches the invention substantially as claimed including a system comprising:

- a. a memory element capable of storing a queue of threads (page 3, paragraph24);
 - b. a unique thread identifier (page 2, paragraph 18);
- c. a next thread value to facilitate access to a next thread in the queue to coordinate access to a shared resource for threads (page 2, paragraph 18 & 21);
- d. a multi-part state lock conveying multiple information including a flag value, a first thread value, and a last thread value (page 2, paragraph 18);
 - e. a lock acquirer capable of acquiring the lock (page 2, paragraph 20) via;
- f. asynchronously querying and receiving a current state of the lock by the lock acquirer and representing each state by a multi-part state value conveying multiple information (page 3, paragraph 22);
- g. speculatively determining by the lock acquirer, the next state of the lock, where the next state is the state of the lock if the lock acquirer proceeds to perform the selected action and the lock acquirer is successful (page 3, paragraph 22); and
- h. attempting to perform by the lock acquirer, the selected action to transition the lock from the current state to the speculatively determined next state (page 3, paragraph 22).
- 37. However, Auslander does not explicitly discloses that the lock is considered to be in any one of at least four states in any point in time. However, Singhal discloses a

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method in which a lock can be in any of at least four states at any time (column 5, line 14 & Figure 7).

- 38. It would have been obvious to one of ordinary skill in the art at the time of invention to have the lock of at least four states of Singhal's invention be the lock in Auslander's invention. One would have been motivated to use this lock since it is known in the computing arts that a lock can have four or more states.
- 39. As per Claims 45-50, they are rejected for the same reason as Claims 17-22 above.
- 40. As per Claim 51, Auslander teaches the invention substantially as claimed including a system comprising:
- a. a memory element capable of storing a queue of threads (page 3, paragraph24);
 - b. a unique thread identifier (page 2, paragraph 18);
- c. a next thread value to facilitate access to a next thread in the queue to coordinate access to a shared resource for threads (page 2, paragraph 18 & 21);
- d. a multi-part state lock conveying multiple information including a flag value, a first thread value, and a last thread value (page 2, paragraph 18);
 - e. a lock releaser capable of releasing the lock (page 2, paragraph 20);

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f. asynchronously querying and receiving a current state of the lock by the lock releaser and representing each state by a multi-part state value conveying multiple information (page 3, paragraph 22);

g. speculatively determining by the lock releaser, the next state of the lock, where the next state is the state of the lock if the lock releaser proceeds to perform the selected action and the lock releaser is successful (page 3, paragraph 22); and

h. attempting to perform by the lock releaser, the selected action to transition the lock from the current state to the speculatively determined next state (page 3, paragraph 22).

- However, Auslander does not explicitly discloses that the lock is considered to be in any one of at least four states in any point in time. However, Singhal discloses a method in which a lock can be in any of at least four states at any time (column 5, line 14 & Figure 7).
- 42. It would have been obvious to one of ordinary skill in the art at the time of invention to have the lock of at least four states of Singhal's invention be the lock in Auslander's invention. One would have been motivated to use this lock since it is known in the computing arts that a lock can have four or more states.
- 43. As per Claim 52, it is rejected for the same reason as Claim 2 above.

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44. As per Claims 53-54, they are rejected for the same reason as Claims 25-26 above.

- 45. As per Claim 55, it is rejected for the same reason as Claim 28 above.
- 46. As per Claim 56, Singhal further discloses the next state is one of:
- a. the lock is not held and there are no threads waiting to access the shared resource (column 7, lines 10-11);
- b. the lock is held and there are no threads waiting to access the shared resource (column 7, lines 12-13);
- c. the lock is held and there is one thread waiting to access the shared resource (column 7, lines 14-15); and
- d. the lock is held and there are at least two threads waiting to access the shared resource (column 10, lines 5-10).

Response to Arguments

47. Applicant's arguments with respect to claims 1-55 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in 48. this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Wilser whose telephone number is (571) 270-1689. The examiner can normally be reached on Mon-Fri 7:30-5:00 EST (Alt Fridays Off).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MPW

October 5, 2007

MENG-AL T. AN
SUPERVISORY PATENT EXAMINER

TECHNOLOGY CENTER 2100